

REMARKS

In the Office Action dated December 2, 2003, the restriction requirement was made final; claims 1, 4, 5, 14, 15, and 25 were rejected under 35 U.S.C. § 102 over U.S. Patent No. 6,144,553 (Hileman); claims 11, 17-19, and 21 were rejected under § 103 over Hileman in view of U.S. Patent No. 6,152,213 (Suzuki); claims 12, 13, and 26 were rejected under 35 U.S.C. § 103 over Hileman in view of U.S. Publication No. 2003/0075312 A1 (Panek); and claims 2 and 3 were rejected under § 103 over Hileman in view of U.S. Publication No. 2003/0056938 A1 (McCullough).

RESTRICTION REQUIREMENT

It appears that a new restriction requirement has been asserted in the present Office Action that differs from the restriction requirement of August 18, 2003. Originally, the restriction requirement contained in the paper mailed August 18, 2003 identifies three distinct species: (1) Figures 1 and 2; (2) Figure 3; and (3) Figures 4, 5, and 6. Applicant made an election with traverse. In the election, Applicant argued that Figure 1 depicts prior art, and thus should not have been identified as being part of a specie of the invention. Also, Applicant argued that Figure 2 depicts a general system-level view of a system that includes heat sinks according to some embodiments. The remaining figures of the application depict the heat sinks that are usable in the system of Figure 2. Therefore, Applicant argued that Figure 2 should not be identified as being a specie distinct from what is depicted in Figures 3-6.

Also, Applicant noted that Figures 3 and 4 also do not depict different species of the invention, but rather show different parts of a heat sink according to an embodiment. In response to these arguments, the Examiner has apparently changed the restriction requirement, and now appears to identify Figure 2 as one specie, and Figures 3 and 4 as another specie. Applicant maintains the position that Figures 3 and 4 are detailed depictions of heat sinks used in the system of Figure 2, and thus Figure 2 and Figures 3 and 4 should not be identified separate species.

As stated by the MPEP, claims to be restricted to different species must be mutually exclusive. MPEP § 806.04(f) at 800-41. The general test as to when claims are restricted, respectively, to different species is the fact that one claim recites limitations which under the disclosure are found in a first specie but not in a second, while a second claim recites limitations disclosed only for the second specie and not the first. *Id.* Here, the features of Figures 3 and 4 are found in the heat sinks 106 and 108 depicted in Figure 2. Therefore, the test of mutual exclusivity necessarily fails. Withdrawal of the restriction requirement is respectfully requested.

The "specie" of Figure 2 (elected by Applicant) has two types of heat sinks: (1) the heat sink 108 connected to heat pipes 107; and (2) heat sinks 106. The details of each of the heat sinks 106 and 108 are depicted in Figures 3 and 4. As stated in the specification, "Fig. 3 shows a portion of the heat sink 106." Specification, p. 6, ¶ [0027]. "Fig. 4 is a perspective view of a fully assembled heat sink in accordance with an embodiment." Specification, p. 2, ¶ [0009]. As further described, the heat pipes shown in Figure 3 are embedded in the heat sink block 120. Specification, p. 7, ¶ [0032]. The specification also states that the arrangement of Figures 3 and 4 can be applied to the heat sink 108 depicted in Figure 2. Specification, p. 6, ¶ [0027]. By electing the specie of Figure 2, Applicant has elected claims readable on a system having heat sink 106 and heat sink 108 (with respective embedded heat pipes). It is respectfully submitted that *all* pending claims 1-39 are readable on the elected "specie" of the Figure 2. In view of this, the Office Action has incorrectly indicated that claims 6-10, 16, 20, 22, 23, and 27-39 are withdrawn. Because claims 1-39 are all readable on the elected specie of Figure 2, Applicant is presenting arguments with respect to all pending claims.

Newly added claims 41-43 are readable on the elected specie of Figure 2.

REJECTIONS UNDER 35 U.S.C. §§ 102 AND 103

It is respectfully submitted that Hileman does not disclose the subject matter of claim 1. Claim 1 recites a heat sink assembly including a heat conduit, a block formed of a thermally conductive material having a first thermal conductivity, and a heat conduit extending through a substantial portion of the block. The Office Action identified heat

pipe 110 depicted in Figures 5 and 6 of Hileman as teaching the heat conduit of claim 1, and identified head disk assembly 130 as being the block recited in claim 1. Note that the head disk assembly 130 is part of the disk drive 102. A careful reading of Hileman will review that the heat pipe 102 is actually *not* connected in any way to the head disk assembly 130. Rather, the heat pipe 110 is connected to a thin conduction plate 104. Hileman, 4:15-17. The heat pipe 110 is further connected to a chilled manifold or expansion chamber 108 through a back plane 106. Hileman, 4:17-19. The heat pipes 110 are designed so that when a disk drive 102 is plugged in, the electrical connection and thermal conduction path to the chilled manifold 108 occur simultaneously. Hileman, 4:18-21. As seen in Figure 7, each heat pipe 110 is a small stub having one end connected to the backplane 106. The other end of the heat pipe 110 is connected to a thin heat conduction plate 104, better shown in Figure 6. Because of the thinness of the plates 104, it is clear that the heat pipes 110 of Hileman do not extend *through a substantial portion* of the plates 104. The thermal conductive path is from the plate 104 through the heat pipe 110 to the back plane 106. The thin conduction plates 104 are designed to cover entire respective surfaces of a disk drive 102. Heat from the disk drive is thus conducted through the thin conduction plates 104 to the heat pipes 110, and ultimately to the chilled manifold 108. In this structure, the heat pipes 110 do not extend through a substantial portion of a block.

Therefore, it is respectfully submitted that claim 1 is not disclosed by Hileman. Independent claim 24 is also not disclosed by Hileman, since Hileman does not teach extending an elongated heat conduit through a substantial portion of a block. Again, all that is disclosed in Hileman is one end of a heat pipe 110 connected to a back plane 106, and the other end of the heat pipe 110 connected to a thin conduction plate 104.

Independent claim 31¹ recites a heat sink having a block formed of a thermally conductive material, with the heat sink having a first segment and a second segment. The heat sink further includes a heat conduit extending *through the block* between the first and second segments, with the first segment to transfer heat from the heat conduit in a

¹ Claim 31 was incorrectly indicated by the Examiner as being withdrawn. Applicant respectfully submits that claim 31 reads on the elected "specie" of Figure 2, as discussed above.

first direction, and a second segment to transfer heat away from the heat conduit in a second direction. Such a feature is not disclosed by Hileman.

Claims dependent from the independent claims are allowable for at least the same reasons as corresponding independent claims.

Claim 11 (which depends indirectly from claim 1) was rejected over the asserted combination of Hileman and Suzuki. Applicant respectfully submits that the asserted combination of references does not teach or suggest the subject matter of claim 11. The Office Action cited Figures 15a, 15b, and 15c of Suzuki as disclosing the block with airflow channels. Note, however, that the airflow channels disclosed in Figures 15a and 15b are part of a heat sink 10 with a cooling fan that has a heat sink plate 12. Suzuki, 1:30-31. The dense electronic package 20 is attached to the heat sink plate 12. There is no indication whatsoever that heat pipes can extend into the heat sink 10. Therefore, the hypothetical combination of Hileman and Suzuki fails to disclose the following element of claim 11: an assembly having a block and a heat conduit extending through a substantial portion of the block, where the block has airflow channels to provide surfaces on the block exposed to airflow. Although the heat sink 10 of Suzuki has airflow channels, there is no suggestion whatsoever within Suzuki or Hileman that airflow channels can be provided in a heat sink through which a heat conduit extends. Therefore, a *prima facie* case of obviousness has not been established with respect to claim 11.

Claims 17-19 and 21 were also rejected over the asserted combination of Hileman and Suzuki. Because the rejection of the base claim (claim 1) is defective, it is respectfully submitted that the obviousness rejection of claims 17-19 and 21 is also defective.

The obviousness rejections of claims 12 and 13 over Hileman and Panek are also defective because the rejection of base claim 1 over Hileman is defective. Similarly, the obviousness rejection of claim 26 over Hileman and Panek is defective because the rejection of base claim 24 is defective.

New independent claim 40 is also allowable over the cited references, as the cited references do not disclose a block and a heat conduit extending through a substantial

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portion of the block where the block has airflow channels adjacent the heat conduit to provide surfaces on the block exposed to airflow.

Allowance of all claims is respectfully requested. The Commissioner is authorized to charge any additional fees, including extension of time fees, and/or credit any overpayment to Deposit Account No. 50-1673 (9926).

Respectfully submitted,



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